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ABSTRACT

Program evaluators and program managers should examine appropriate dimensions of innovations when deciding to support, accept, or reject an educational innovation. Survey questionnaires were used with 76 teachers and administrators and 65 state supervisors and local project directors of exemplary programs to obtain a list of 38 "essential" characteristics of innovations. An additional 300 educational practitioners responded to a 50-item questionnaire which included the 38 items and Likert-type response categories. These responses were factor-analyzed to identify six dimensions of innovation characteristics: student concern orientation, additional resource requirements, organized resistence potential, consumer report, credibility, and operational implementation. A bibliography is provided. (Author)

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INNOVATION CHARACTERISTICS CRITICAL TO THE SUCCESSFUL ADOPTION OF PROGRAMS IN SCHOOL SETTINGS

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The research results reported in this paper are part of a programmatic activity at The Center for Vocational and Technical Education (CVTE) to devise better ways of formulating diffusion strategies for educational research and development products. The paper is written from a product developer's perspective which, hopefully, does not ignore the constraints and conditions which impinge on utilization of R & D products in school settings. In fact, the study was designed to obtain potential product users' perceptions of essential innovation characteristics.

No attempt will be made in this paper to resolve the question of whether it is best to impose innovations from outside the product user's organizational unit or develop them from within. The position of the innovation advocate (either inside the targeted user's setting, or outside of it) does influence his knowledge of the setting and the availability of means for building rapport with potential users of the product. An insider's (or outsider's) perspective could result in the use of different tactics to gain the acceptance of an innovation, but the advocate's perspective should not change the intrinsic characteristics of the innovation perceived to be critical for successful adoption.

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[1]The authors are research and development specialists at The Center for Vocational and Technical Education, The Ohio State University. The views indicated in this paper are those of the authors alone and do not necessarily represent official positions of The Center for Vocational and Technical Education or the sponsors of the research. The sponsors of the research were the Office of Education and the National Institute of Education. This paper was presented at the Annual Meeting of the American Educational Research Association at Chicago, Illinois, April 17, 1974.

Purpose of the Research

The primary purpose of this research was the identification of underlying characteristics of innovations perceived as important by educational practitioners. If identifiable, these underlying characteristics or dimensions could be used by researchers to further study processes associated with innovation diffusion. In addition, the dimensions could be used by practitioners to describe the innovations to potential user audiences. Rogers and Shoemaker (1971) point out:

> We need a standard classification scheme for describing the perceived attributes of innovations in universal terms. Then one would not have to study each innovation in order to predict its rate of adoption. (p. 137)

Need for the Research

Attempted improvement in educational practice is being stimulated by federal dollars. A preliminary report of the National Advisory Council on Education Professions Development (1973) indicates the federal government has invested some 25 billion dollars over the past 10 years in efforts to improve education in the elementary and secondary schools, in the colleges and universities, and in other settings.

Another government report, this one from the National Institute of Education (1973), lists the federal obligations for education research and development for fiscal year 1972 as 177 million dollars. Despite these major investments in new products to improve education, very little evidence exists to suggest that research and development products have had much of an impact on educational practice. In fact, the public may have less confidence in schools than they had 10 years ago.

According to an article by Assistant Secretary of Health, Education and Welfare, Sidney P. Marland, Jr. (1973), the American public has lost confidence in the prospect of achieving the universally "better" schools.

This mood has influenced the number of school bond referendums approved. As recently as 1965, 79.4 percent of public elementary and secondary school bond referendums were approved. By 1972, that figure was only about 47 percent. A report by Averch, et al. (1972) on the effectiveness of schooling, paints a dismal picture of research evidence which shows the effect of school resources on student outcomes. One of the policy recommendations in this report is:

> Increasing expenditures of traditional educational practices is not likely to improve educational outcomes substantially. (p.155)

Therefore, the need exists for non-traditional approaches to educational practice. But such approaches (in the form of research and development products) must be thoroughly tested and the results communicated to teachers and others who are expected to use the products. Frequently, innovations are thrust upon teachers who do not understand and are not prepared to accept them.[2] Gross, et al. (1971) reported on one such attempt. They concluded:

> One barrier that blocked the teachers' efforts to implement the innovation throughout the six-month period was their lack of clarity about the new role model. Our observations of teachers indicated that most of them did not have a clear image of the role performance expected of them. (p. 196)

If underlying dimensions of innovation characteristics (e.g., space requirements, benefits to the students, potential for creating organized resistance, etc.) could be identified across all types of innovations, such general characteristics could be used by developers of research and development products to communicate the requirements for successfully installing the innovation in a given setting. Such dimensions would also provide product developers with standard categories for information collection during field tests of the product.

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[2]The process of implementing organizational change in schools is very complex. It involves group decision-making procedures in an institution (the school) which is ill-equipped for dealing with risk and uncertainty. See a recent article by Pincus (1974) for a cogent review of incentives for innovation in the public schools.

Glossary of Terms

ACCEPTANCE is the use and approval of an innovation by an individual or organization.

ADOPTION is the decision to make full use of a new idea as the best course of action available (Rogers and Shoemaker, 1971).

ADVOCATE is the individual or group of individuals who has accepted or has been assigned the responsibility of influencing the acceptance and/or use of a particular product or set of products.

DIFFUSION is the process through which a product is accepted over time by adopting units.

DIMENSION is one of a set of coordinates containing suffcient subdimensions to distinguish one aspect of the innovation diffusion process from all others.

INNOVATION is a research-based educational product perceived as new by a user.

PRODUCT is exportable information, methods and/or materials which, when used as prescribed, will produce specified outcomes with designated targeted users.

USER AUDIENCE is an individual or group of individuals who has potential for utilizing the product. On some occasions in this paper the adjective "targeted" is used with this term to indicate a user audience designated by the product developer.

A Conceptual Framework

The authors (1973), developed a conceptual framework to guide research and development of innovation diffusion strategies. The principle elements of the framework formed the basis for this study. The four elements of the framework are: the innovation, the advocate, the consumer (intended user) of the innovation, and the strategy used to bring about the utilization of the innovation.[3] The innovation is important because it represents the change to be made. The discrepancy between the present state of the target user system and the desired state as represented by the innovation is a

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[3]This schema smacks of products engineered by developers who reside outside of the school setting. See Giacquinta (1973) for a discussion of this approach to change in schools compared with greater participation by school personnel.

chief determinant of the tactics to be used in installation. The advocate of the innovation may be a developer, a present user or some other person who desires to promote the use of the innovation. He must assess his relationship to the intended user and devise ways of communicating the attributes of the innovation. The consumer is the person or persons to be influenced by the advocate. Consumers possess perceptions of the advocate and the innovation which must be assessed if the advocate is to devise an effective strategy for innovation use. The fourth element of the paradigm, the strategy, is likely to be made up of tactics sequenced to obtain limited objectives during the process of installing the innovation (gaining the acceptance of the targeted user). Information about the innovation plays a key role in gaining the acceptance, support, or rejection of the innovation by the intended user. This information should be factual and presented to the potential user in a manner which will accurately describe the innovation to him. To do this, the advocate must be able to assess some of the changes which are likely to take place in the school setting if the innovation becomes fully installed. In addition, the advocate must be aware of the characteristics of the innovation perceived as important by the intended users.[4] This is the reason some of the items in the factors in this study address some of these changes. See the tables in the results section of this paper.

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[4]It is useful to note that potential users of innovations may not perceive characteristics of innovations in the same manner as the advocate or the developer of the innovation. A user's perceptions always are conditioned by his role in the school system, the amount of change in his responsibilities which is likely to occur if the innovation is installed, and other factors. The authors of this paper believe the user's perceptions of the importance of innovation characteristics provide a means of communicating the potential benefits and liabilities of installing an innovation in a particular setting. This is the reason for studying potential users' perceptions of the importance of selected innovation characteristics.

Innovation Definition and Classification

The concept of "innovation" has been defined various ways by researchers and others depending upon the objectives and rigor of their studies. The concept can be used as an adjective to indicate the newness of an idea; it can be used to describe a state of mind or condition of an individual e.g., innovator; or it can be used to describe a product itself. The authors choose to use it in the sense of a product, a research and development product. Thus, this paper will use the word "innovation" to mean a specific product or practice to be used in school settings. Trow (1967) captures the spirit of an innovation with this brief description:

> An innovation is a break with routine and habit; it disrupts unreflective ways of thinking, feeling, and behaving; it requires a heightened measure of attention and interest in the matters at hand; it forces the participants, and especially the creators, to think in fresh ways about familiar subjects, to reconsider old assumptions. (p. 4)

One of the definitions of innovation which has persisted over time has been the Rogers and Shoemaker (1971) notion of innovation as "an idea, practice, or object perceived as new by an individual." (p. 19) It matters little if an idea is objectively new. Presser (1969) points out that an innovation has a point of origin in place and time when it is properly considered an invention or a new development. Please note: a product is defined as an innovation by the perceptions of the user audience, not by the perceptions of the product developers.

Innovations are as difficult to classify as they are to define. Zaltman, et al. (1973) reviewed schema for classifying innovations based on their effects on the target system, their initial focus, and their outcome. It is difficult to build a taxonomy of innovations without relating the innovation to the situation to be changed. Havelock (1969) discusses innovations by types of characteristics. His major categories include both intrinsic characteristics and extrinsic characteristics.

The following discussion does not distinguish between intrinsic and extrinsic characteristics of innovations. As indicated in a previous footnote, such a classification may depend upon the perspective of the viewer e.g., product developer versus product user. The next section of this paper does identify some characteristics of innovations and studies of the impact of these characteristics on adoption of practices.

Characteristics of Innovations

The characteristics of innovations are not absolutes; they vary depending on the eye of the beholder. Rogers and Shoemaker (1971) identify five characteristics of innovations which have been used to explain much of the variance in adoption research studies:

1. Relative advantage is the degree to which an innovation is perceived as better than the idea it superseded...
2. Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and the needs of the receivers...
3. Complexity is the degree to which an innovation is perceived as difficult to understand and use.
4. Trialability is the degree to which an innovation may be experimented with on a limited basis...
5. Observability is the degree to which the results of an innovation are visible to others. (pp. 22-23)

Each of these concepts describes a quality of the innovation as it is contrasted with an existing situation. These variables represent an interaction between the innovation and a prospective user audience.

Fliegel and Kivlin (1966), and Clinton and House (1970) have used these characteristics and others on selected target audiences. The Clinton and House (1970) study found efficiency to be significantly related to innovation adoption when 16 characteristics of innovations were studied among 337 teachers in five urban school districts. Divisibility and novelty were not perceived to be important by the teachers.

Fliegel and Kivlin (1966) compared initial cost, continuing cost, the saving of discomfort and the saving of time, payoff, social approval, recovery of cost, divisibility for trial, regularity of reward, clarity of results, complexity, compatibility, pervasiveness of consequences, and mechanical attraction in their study of innovation characteristics of 33 modern practices among dairy farmers. In this study initial cost was not considered a deterrent to rapid adoption. Some evidence existed to indicate that high continuing cost could become a deterrent to adoption. However, farm operators studied were apparently willing to make investments and wait for those investments to pay off. The saving of time and the saving of discomfort received some support in the data but were overshadowed by other attributes. Divisibility for trial seemed to be an important factor in the minimization of risk involved in adoption of innovations. A weak relationship existed between clarity of results and rate of adoption. Compatability of the innovation with the adopting unit was not an important factor in explaining rate of adoption. The receptivity of the potential adopting unit may need to be assessed in order to take this characteristic into account. Pervasiveness was not an important deterrent to rapid adoption for this sample.

Summary

The reader should keep in mind that much of the knowledge about innovation diffusion is based on common sense and conceptualizations which have yet to be reliably observed. Gross, et al. (1971) cautioned:

> Our review indicated that the literature is deficient in several important respects. First, there has been little concern for testing theories or generating testable hypotheses about factors influencing degree of implementation. Second, data used to isolate conditions having an impact on implementation are typically obtained only from the perspective of those who initiate them; they generally ignore the point of view of organizational members who must make the behavioral changes specified by the innovation. (p. 35)

Methodology

This study of innovation characteristics was extracted from a more comprehensive conceptual framework to aid evaluators and program personnel in the selection of innovations and innovation diffusion strategies for school settings. This paper is limited to a discussion of underlying dimensions of innovation characteristics. The dimensions aim for generalizatio[illegible]hich can be applied to a wide variety of innovations by taking previously identified characteristics of innovations and analyzing them via factor analysis. The term "innovation" was not defined for respondents. Responses of potential users of innovations were obtained for this analysis. Therefore, the authors believe the point of view of practitioners is represented in the data. Several procedures were used to obtain such inputs, both in the form of structured responses and interviews.

Conduct of the Study

The results reported in this paper are the product of two research endeavors in the Diffusion Program at The Center for Vocational and Technical Education. Data were collected during the first phase of this study in the spring and fall of 1971 from groups of vocational educators for the purpose of identifying and refining elements of an Innovations Evaluation Guide.[5] Data for the second phase of the study were collected in the spring of 1972 from a broader spectrum of educators. These data were factor analyzed to identify underlying dimensions of innovation characteristics.[6] These factors are presented in this paper.

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[5]Detailed information on this study and a copy of the Guide can be found in Hull and Wells (1972).

[6]See Kester and Hull (1973) for more detailed information on this study.

Population and Sample

Phase I respondents were selected from available personnel in vocational and technical education who were knowledgeable about the development and installation of innovations. After identifying characteristics of innovations from the literature and conducting brief interviews with superintendents of school systems in Ohio, 76 teachers and administrators in four states were identified to complete a questionnaire. These teachers and administrators were engaged in implementing exemplary programs in their local education agencies. In addition to this sample of teachers and administrators from exemplary program sites, state supervisors and local project directors of exemplary programs in vocational education responded to the initial instrument. Sixty-five usable responses were obtained from the 88 state supervisors and local project directors contacted.

Phase II respondents were a sample of 300 individuals distributed across local administrators, local secondary teachers, state department of education supervisors, teacher educators, and state policy makers (state board members and state advisory council members) in two states. The response rate from each sub-category of subjects ranged from 96 percent from local administrators to 33 percent from state board members for an average response of 81 percent. This sample included but was not limited to vocational educators.

A two-phased sampling technique was employed to identify sites for the Phase II questionnaire administration. Two urban sites were selected from criteria based on national statistics. The urban sites were to:

1. Have a school district student population above 25,000,
2. have a citizen population above 150,000,
3. have a black population of between 9 and 14 percent,
4. have another minority population (other than black or white) of between .5 and 2 percent,

5. have a per capita income between 90 and 110 percent of the average for Standard Metropolitan Statistical Areas,

6. have a per pupil expenditure within two hundred dollars of the national average, and

7. be in two different census areas.

Following the selection of the urban sites in each state, suburban sites were selected as were rural sites. The suburban sites were districts adjacent to the urban districts. The rural school districts were at least 25 miles from a city of 50,000 population or more and had a population of 5,000 or less.

Data Collection Procedures

The exemplary project sites selected in Phase I of the study were located in particular school buildings. No selection of the buildings was necessary. Teachers were randomly selected from schools in both phases of the study. In Phase II of the study, administrators in the urban areas identified an inner city school and an outer city school as data collection sites. In all cases, the suburban and rural school districts had only one high school. Preference was given to teachers and administrators in high schools only (grades 9 through 12) although some junior high school personnel were used. This was necessary in the rural areas in particular because many of the districts had junior-senior high schools. Phase II data collection averaged about five teachers per school in the rural sites and seven teachers per school in the urban and suburban sites. Administrators in these local school systems were not randomly selected because of insufficient numbers at each site.

State supervisors and teacher educators responding to the data collection instrument were in divisions of vocational and technical education. All staff members in each of the two states were requested to respond.

State policy makers were selected from only one state because researchers were unable to obtain an endorsement for contacting them in the other state. All state board members and state vocational education advisory council members in the one state received a mailed questionnaire requesting their responses.

Generation of Items

As noted in the previous section, the researchers traveled to various sites in Ohio to obtain openended inputs from superintendents of local education agencies for the questionnaire in Phase I. At the beginning of Phase II another series of visits were held with project directors at local sites in Ohio who were implementing an innovative program. These interviews served to sensitize the researchers to some of the day-to-day problems experienced by persons asked to install an innovative product. This information was used as a basis for writing items for the Phase II questionnaire.

The items written for the Phase I questionnaire were summarized in the Hull and Wells report (1972) and revised for use in the Innovations Evaluation Guide. The 38 characteristics of innovations listed in this guide were rewritten into a fifty item questionnaire with Likert-type response categories. The following criteria were used as guidelines in the rewriting of the items:

1. Items must flow like conversation.
2. Verbs used were to be probabilistic whenever possible.
3. Items were to contain a minimal amount of jargon.
4. Each item had to be written such that it could be answered on the degree of importance continuum.
5. Items should not be "socially acceptable." In other words, the items should not force a favorable reaction from all people.
6. Items should not be bipolar; they should deal with only a single central concept.

7. Items should be written that will tap the relevant dimensions in the a priori conceptual categories.

8. Items should not be bague or ambiguous.

9. Items should be behaviorally stated in most cases.

10. The number of negatively and positively stated statements should be balanced.

The final 50 items were randomized on the questionnaire form and associated with a five-point rating scale ranging from "not important" to "very important." Each respondent was asked to rate the relative importance of each characteristic (item) from the point of view of his or her role in his or her profession. All of the items in the questionnaire are included in tables 1 through 6 except for item number 38 "the innovation can be quickly installed?" and item number 41 "parents may object to the innovation?"

Analysis Procedures

Data collected in Phase I were summarized by frequency count according to respondent group. No inferential statistics were used in this summary. Factor analytic procedures were used for the Phase II data since the primary purpose was the identification of underlying dimensions among innovation characteristics. Two variations of the principal component factor analytic model were used: (1) a principal component analysis with the input matrix being the Pearson product-moment correlations of items across all subjects; and (2) a principal component analysis with the sum of the squares and the cross products of the raw scores (item responses) as the input matrix, which is similar to a design developed by Tucker and Messick (1963). Unrotated and varimax rotated solutions of each of the models were compared. Charts of eigenvalues were initially used to select various numbers of factors to be rotated. The six factors selected accounted for 63 percent of the variance in the solution. The selection of the "best" factor solution was based on criteria similar to that in Rummel (1970, pp. 473-475).

Results

This section of the paper summarizes the results from each data collection phase. The Phase I summary contains a discussion of the innovation characteristics perceived as essential for teachers and administrators. The Phase II results contain a discussion of the implications of these innovation characteristics as dimensions for evaluating potential innovations to be installed in school districts.

Essential Innovation Characteristics

In the first phase of the study the following characteristics of innovations were considered to be most essential by both teachers and administrators when evaluating an innovation: quantity of staff needed to install and operate the innovation, installation and maintenance costs, availability of dollars for installation, space requirements of the innovation, lead time necessary for adequate installation, sources of dollars necessary for operation, hardware required by the innovation, and the complexity of the innovation. Items rated least essential by all respondents were: rate of learning, entry and advancement in an occupation, new relationships among groups, cyclical considerations, economic and social efficiencies, reliability, and divisibility. Generally, the respondents felt the cost items such as sources of dollars, availability of dollars, limitations on uses of dollars, as well as the effect of the innovation on staff organization, quantity of staff, arrangement of space and policy changes should be essential considerations for administrators alone. No items were rated as essential for teachers only.

State supervisors, local administrators, local project directors, and local teachers held similar perceptions of the importance of innovation characteristics. Involvement in school-related tasks had no effect on

perceived importance of the various characteristics. These findings influenced the decision to run a factor analysis on all respondents as a data set in the Phase II analysis.

Underlying Dimensions of Innovation Characteristics

The following tables of factor loadings represent the most parsimonious interpretation of several factor solutions. The reader should keep in mind that the following discussion of the factors is heuristic and based entirely upon the factor combinations presented in this paper. The title of each table is the name given the factor for identification purposes.

Table 1 indicates the first dimension: a concern for student needs. Note the high loadings on the items which focus on student learning. All six of the items in the questionnaire containing the word "student" loaded on this factor. Perhaps this factor reflects the teachers' and administrators' desire to evaluate most innovations in terms of their impact on student performance. The other items loading high on the factor indicate a willingness to risk some resources in the development of the innovation. As the first factor in the principal component analysis, this factor accounts for 39 percent of the variance in the solution. It is a general factor which may reflect the subjects' concerns for socially desirable responses. Questions concerning the welfare of students affected by installation of the innovation would be considered very proper responses for teachers in almost any setting.

The next most important dimension underlying the characteristics of innovations is illustrated in Table 2. Additional resources required by the innovation are a concern of potential user audiences. Will the staff need to be retrained? Where will the innovation be located? Who will be responsible for it? These questions are likely to come from prospective users. Decision-makers in school settings should be prepared to share "best estimates" with staff personnel at the time the innovation is introduced.

Table 1

STUDENT-USER CONCERN ORIENTATION

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
3	26.50	the innovation may improve student's attitudes toward school?
7	23.90	the innovation may help the student learn faster?
13	23.74	the innovation may help the student learn additional skills and ideas?
9	20.83	the innovation may teach the student about himself?
5	20.19	the innovation may help the student get a job?
34	19.98	the users believe that the innovation will succeed?
31	-18.74	the innovation be consistent with the traditional subject matter areas?
40	17.51	the teachers can help in the development of the innovation?
18	16.46	the innovation provides evidence of its success?
20	-14.82	you are not the one who will be responsible if the innovation fails?
23	14.13	the students can help in the development of the innovation?
1	9.99	the superintendent of schools may be against the innovation?
30	9.87	funding may be available only for the initial stages of the innovation?
50	9.84	students may object to the innovation?
26	9.69	the goals of the innovation match the community values?
22	9.57	the innovation may require additional building space?
21	-7.60	the innovation be consistent with existing organizational policy?

Table 2

ADDITIONAL RESOURCE REQUIREMENTS

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
33	14.63	the innovation may require retraining of existing staff?
22	14.57	the innovation may require additional building space?
24	13.44	the innovation may require additional equipment?
45	13.22	the innovation may require additional staff?
27	12.40	the innovation may require additional supplies?
29	11.92	the innovation may require skills not present in the existing staff?
43	11.79	the innovation may require time for preparing the staff to use it?
39	11.78	the innovation may require new uses of existing space?
47	11.50	the innovation may require a structural change within the organization?
16	10.60	the innovation may require a request for outside funds?
48	10.27	the innovation does not go over the existing budget?
49	10.00	the innovation may require that time be spent in daily or weekly planning?
30	9.87	funding may be available only for the initial stages of the innovation?
46	8.27	the innovation cannot be adjusted to fit existing class schedules?
35	8.24	the innovation may change the working relationships between teachers and principals?
17	7.82	the innovation may change the working relationships among teachers?

Considering the concern expressed by respondents in Phase I for cost information on innovations, this factor should be taken very seriously by any evaluator of innovations. The factor accounts for 13 percent of the variance among innovation characteristics.

The next three dimensions account for only 3 percent each of the variance present in the factor solution. This means the respondents held relatively similar views on the importance of innovation characteristics related to student needs and requirements for installation. Respondents perceptions of the importance of organized resistance, consumer report ratings, credibility, and operational implementation concerns, were more heterogeneous.

Table 3 illustrates a dimension concerning the potential for organized resistance. Like the previous factor, it deals with the potential consequences of implementation. The three highest loading items on this dimension contain personnel positions in the schools which are critical to the acceptance and installation of innovations. This is the reason for including the term "organized" in the label. Two other items "parents may object to the innovation" and "students may object to the innovation" are conspicuously absent from the list. Advocates of innovations should be alert to indicators of potential resistance among targeted users of innovations. Innovations should be scrutinized for characteristics which may cause resentment or resistance from potential users.

Users of innovations have a right to expect a product to perform "as advertised" in school settings. Table 4 contains items on a consumer report dimension. Is the innovation authentic? Can the developers substantiate their claims for success of the product so it can be represented to school personnel and members of the community? Increasingly, evaluation of innovations may be able to call on developers to warantee or otherwise guarantee the products they install. Accurate information about the innovation is

Table 3

ORGANIZED RESISTANCE POTENTIAL

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
1	16.89	the superintendent of schools may be against the innovation?
10	16.21	the principal may be against the innovation?
4	12.13	teachers may object to the innovation?
15	8.00	the general public may object to the innovation?
3	6.51	the innovation may improve students' attitudes toward school?
18	5.99	the innovation provides evidence of its success?

Table 4

CONSUMER REPORT RATING

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
42	12.03	the developers of the innovation guarantee that it will do what they say it will?
25	10.74	the innovation has been used successfully in school districts like yours?
19	10.22	the consumers know exactly how much the innovation will cost in the long run?
26	9.08	the goals of the innovation match the community values?
28	8.74	the innovation may get bad publicity?
30	7.99	funding may be available only for the initial stages of the innovation?
44	7.98	the innovation gets good publicity?
2	7.44	the innovation saves money?
5	7.04	the innovation may help the student get a job?
18	7.02	the innovation provides evidence of its success?
37	6.99	the innovation could be tested on a small scale before it is completely installed?

essential in developing a level of expectation within potential users which is realistic for the adoption unit. Conditions vary from adoption site to adoption site. It is incumbent upon the advocate to accurately assess the need for this information.

Table 5 contains items which relate to the credibility of the innovation. The two highest loading items seem to presuppose a knowledge of the organization that developed the innovation and/or the advocate of the innovation. This knowledge can be critical to the acceptance of the innovation because the decision to try an innovation may be based on the recommendation of someone who is trusted and respected. If the innovation is to be presented to parents, particularly by teachers, it must have sufficient supporting technical information to make it credible.

Table 6 lists Operational Implementation Concerns which are likely to occur in the installation of any innovation. The concerns are somewhat similar to dimension 2, but they extend beyond the monetary needs of installation. The items suggest concern by potential users for the past reputation of the adopting unit, the desire to install innovations incrementally and a need to adapt the innovation to local conditions. Day-to-day installation activities will vary from site to site, but they should be assessed and anticipated prior to a commitment to use the innovation. This factor explains 2.4 percent of the variation in the solution.

Summary of the Results

The identification of six dimensions which undergird characteristics of innovations is the major finding to be reported. The six factors (dimensions) accounted for 63 percent of the variance in the factor solution. Additional studies designed to confirm or reject the utility of these dimensions for describing innovation characteristics are planned. A brief explanation and discussion of each dimension follows:

Table 5

CREDIBILITY

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
12	11.15	you respect the organization that produced the innovation?
14	9.67	you have confidence in the individual proposing the innovation to you?
36	8.41	the innovation may require more parent participation in the school program?
32	7.66	the teacher may be the one who has to "sell" the innovation to the principal?
35	7.45	the innovation may change the working relationship between teachers and principals?
44	7.09	the innovation gets good publicity?
2	-6.22	the innovation saves money?
43	5.65	the innovation may require time for preparing the staff to use it?

Table 6

OPERATIONAL IMPLEMENTATION CONCERNS

ITEM	RANKED FACTOR LOADINGS	ITEM CONTENT
6	17.13	the innovation may point out some flaws in the past system?
2	7.91	the innovation saves money?
35	7.04	the innovation may change the working relationships between teachers and principals?
8	6.38	the innovation can be put into practice on a step-by-step basis?
46	5.38	the innovation cannot be adjusted to fit existing class schedules?
11	5.02	the innovation fits smoothly into the present set-up?
36	5.02	the innovation may require more parent participation in the school program?
47	4.96	the innovation may require a structural change within the organization?
25	4.85	the innovation has been used successfully in school districts like yours?
5	4.53	the innovation may help the student get a job?
39	4.17	the innovation may require new uses of existing space?
49	4.11	the innovation may require that time be spent in daily or weekly planning?
29	-3.65	the innovation may require skills not present in the existing staff?

1. Student Concern Orientation. This factor accounted for 39 percent of the variance in the domain of innovation characteristics. Respondents were concerned that the innovation be orientated to student growth and development. This concern was substantiated by results from the first respondent group.
2. Additional Resource Requirements. The next most important consideration for anyone advocating the adoption of an innovation in an education setting is the resources required for implementation. This variable becomes critical if the adopting unit lacks these resources. This factor accounted for 13 percent of the variance among innovation characteristics.
3. Organized Resistance Potential. As in the previous factor, the content of this factor is focused on the adopting unit. When and where in the installation process will the advocate of an innovation encounter resistance?
4. Consumer Report. This factor asks for assurance that the innovation can deliver what is promised by advocates. It emphasizes the need for adequate technical information on prior performance of the innovation.
5. Credibility. This factor highlights the need for the producer of the innovation and the advocate to be respected by the users of the innovation.
6. Operational Implementation. The installation and use of an innovation include several day to day decisions which affect working relationships among users. This factor addresses the problem of fitting the innovation smoothly into the operational organization of a school system.

Implications for Adoption of Programs

The six underlying dimensions of innovation characteristics are presented as indicators of product utility which should be assessed prior to a final commitment to implement an innovation. They are comparable across innovations but not always to the same degree. That is, *one innovation in* a particular setting may require a greater degree of assessment on one dimension than another.

Successful adoption of an innovative program in a school depends upon many factors including the day-to-day tasks of keeping the school operational while the innovation (which may be a major disruption) is being installed. These factors could become indicators of innovation installation success or failure.

It would be desirable to devise a monitoring process which could provide management in the school system with information on the progress of the installation process. Assessment of innovations is not a one-shot enterprise. School settings are dynamic, therefore constant surveillance should be maintained over the innovation to assure prompt and responsive "corrections" in installation activities when they are needed. Changes in installation activities should be based on information concerning how users are responding to characteristics of the innovation.

REFERENCES

Averch, Harry A. and others. How Effective is Schooling? A Critical Review and Synthesis of Research Findings. Santa Monica, CA: The Rand Corporation, March 1972.

Building Capacity for Renewal and Reform: An Initial Report on Knowledge Product and Utilization in Education. Washington, DC: Task Force on Resources Planning and Analysis, Office of Research and Development Resources, National Institute of Education, December 1973.

Clinton, Alfred, and House, John H. "Attributes of Innovations as Factors in Diffusion." Paper presented at the annual meeting of the American Educational Research Association, March 3, 1970, Minneapolis, MN.

Evaluation of Education: In Need of Examination. Washington, DC: National Advisory Council on Education Professions Development, 1973.

Fliegel, Frederick C., and Kivlin, Joseph E. "Attributes of Innovations as Factors in Diffusion." The American Journal of Sociology, Vol. 72, November 1966, pp. 235-247.

Havelock, Ronald G. Planning for Innovation Through Dissemination and Utilization of Knowledge. Ann Arbor, MI: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, 1971.

Hull, William L.; Kester, Ralph J.; and Martin, William B. A Conceptual Framework for the Diffusion of Innovations in Vocational and Technical Education. Columbus, OH: The Center for Vocational and Technical Education, The Ohio State University, March 1973. (ED 079 468)

Hull, William L., and Wells, Randall. The Classification and Evaluation of Innovations for Vocational and Technical Education. Columbus, OH: The Center for Vocational and Technical Education, The Ohio State University, July 1972. (ED 067 623)

Kester, Ralph J., and Hull, William L. Identification of Empirical Dimensions of the Diffusion Process: Interim Report. Columbus, OH: The Center for Vocational and Technical Education, The Ohio State University, October 1973.

Marland, Sidney P., Jr. "Education and Public Confidence," American Education, Vol. 9, May 1973, pp. 5-10.

Pincus, John. "Incentives for Innovation in the Public Schools." Review of Educational Research, Vol. 44, Winter 1974, pp. 113-144.

Presser, H. A. "Measuring Innovativeness Rather Than Adoption." Rural Sociology, Vol. 34, December 1969, pp. 510-527.

Rogers, Everett M. Diffusion of Innovations. New York, NY: The Free Press, 1962.

Rogers, Everett M., and Shoemaker, F. Floyd. Communication of Innovations: A Cross-Cultural Approach. New York, NY: The Free Press, 1971.

Rummel, R. J. Applied Factor Analysis. Evanston, IL: Northwestern University Press, 1970.

Trow, Martin. "Methodological Problems in the Evaluation of Innovation." Paper presented at the Symposium on Problems in the Evaluation of Instruction. University of California, Los Angeles, December 1967.

Tucker, L. R., and Messick, S. "An Individual Differences Model for Multidimensional Scaling." Psychometrika, Vol. 28, 1963, pp. 333-367.

Zaltman, Gerald; Duncan, Robert; and Holbek, Jonny. Innovations and Organizations. New York, NY: John Wiley and Sons, 1973.

Gincquinta, Joseph B. "The Process of Organizational Change in Schools." Review of Research in Education Itasca, Ill.: F. E. Peacock, Inc. 1973